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Pylons in the Back Yard

Local Planning and Perceived Risks to Health

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Abstract

Health fears arising from the presence of high-voltage power lines in residential areas have received recent attention in spatial planning. A study of stances taken by planning authorities in England and Wales shows their willingness to give expression to the concerns of local communities through precautionary measures, and the difficulties encountered in the face of official statements and industry opposition. These attempts to embody local feeling in patterns of development are illustrative of the increasing prevalence of a sense of risk in contemporary society. The spatial patterns of risk are also revealed, which owe much to the presence and distribution of industrial infrastructure in the landscape and to the associated contested use of land.

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Introduction

The paradigm of a 'risk society', in which technological and material development is seen as an inevitable and increasing source of threats to human (and non-human) well-being (Beck 1992), is one that has gained considerable ground. Public health scares, such as the BSE crisis that originated in the UK, and the use of HIV-infected blood supplies in France, have given a new resonance to this notion (Oosterveer 2002), adding to the longer-standing concerns about 'radioactivity, toxins and pollutants' that lay behind Beck's work. Implicit in this assertion of risk as a defining feature of advanced modernity is a shift in understanding of risk itself, away from the narrow confines of statistically based risk analysis, towards broader social constructions of risk. Here, not only the veracity of scientific conclusions about degrees of risk is open to challenge, but also the assumptions embodied in scientific studies may be questioned, such as the acceptability of minimal degrees of risk. This is because risks themselves are now thought to be threats to society of a far greater order than hitherto, and are by definition incalculable and unpredictable (Goldblatt 1999).

In this context, the role of scientific analysis in public policy-making is weakened, with greater attention being given to broader public concerns. This is particularly so in areas of policy where there is opportunity for public involvement, and where this is prioritised - such as in spatial planning, where policies are formed to guide local development decisions. Here, the interface between scientific assessment and democratically accountable policy-making is likely to be charged by the attitudes and actions of local communities making their *own* evaluations of the risks posed within their localities. Indeed, many of the issues associated with risk take on their immediacy within the local spatial environment, and the participative mechanisms of land-use planning may provide a means for differing interpretations of risk to find expression.

It is with this potentially dynamic interchange between different perspectives in mind that this article explores the perceptions of risk that have arisen in relation to a specific land-use issue. The topic investigated is the perceived threat to human health posed by high-voltage electricity infrastructure, with England and Wales taken as a study area. Although not a new concern, the alleged threat to human health posed by electricity installations, especially overhead power lines, has been given renewed policy attention by local planning authorities over the last few years (Jay and Wood 2002). This is not least because of the greater willingness of local authorities to assert their local environmental interests over the needs of the now privatized energy utilities (Jay 2004). In turning to health aspects of overhead lines, these authorities have engaged with strong community feeling on the one hand, and a powerfully-organised electricity industry on the other, and have sought to resolve deeply divided interests through the juxtaposition of contrasting forms of development. More fundamentally, however, the adoption of this issue within planning reaches beyond more traditional health and safety concerns, and raises the question of what constitutes a valid risk - not just for planning, but also in wider social terms, and by what, and by whose, criteria such risk is defined.

By way of background, an account is given below of scientific and policy-making perspectives of the possible threat to health posed by the electromagnetic fields emitted by power lines. These perspectives themselves involve a degree of conflict, voiced powerfully through media reports. This is followed by an empirical study of attempts by local planning authorities in England and Wales to represent community anxieties about electromagnetic fields through the instruments of planning, and to incorporate their concerns into patterns of development. Some of the issues and dilemmas that have arisen through these attempts to address

questions of risk are then discussed, with reference to the particular perspective offered by planning on notions of risk.

Overhead Lines, Electromagnetic Fields and Health

The development of systems for the supply of electricity has made high-voltage installations, especially overhead power lines, a familiar feature of many landscapes. Overhead lines consist of metal conductors supported at height from towers and poles of various kinds; higher voltage conductors are usually supported by steel latticework towers commonly referred to as pylons. These are substantial structures, generally varying in height from 25 to 50 metres in the UK, which, given their industrial nature, are not easily absorbed into their surroundings. In the countryside, especially in areas of scenic value, overhead lines have often been considered visually intrusive, and have been objects of dissatisfaction, even vehement opposition (Countryside Commission 1994, Luckin 1990). Likewise, overhead lines in urban areas have caused unease for people living and working close to them, because of their perceived unsightliness, occasional humming and crackling noises and interference to electrical equipment (Lomas et al 1996, Furtado et al 2000). Of increasing prominence over recent years, however, has been the concern that high voltage lines may have adverse consequences for human health. This centres on the possibly cancerous effects of the electromagnetic fields that they emit, especially for people who are subjected to prolonged exposure; these anxieties have manifested themselves around the world since the 1980s, and have sometimes reached considerable levels of alarm (UK CEED 1991).

Electromagnetic fields (EMF, hereafter used as an acronym in the singular) consist of both electric fields, which are produced by connection to an electricity supply, and magnetic fields,

produced when current is flowing. EMF is, in fact, constantly present in the environment; it is produced naturally, by thunderstorms for instance, and by human sources, including electrical equipment. Overhead lines are one such source: they give rise to a low frequency, non-ionizing form of EMF (this is in contrast to ionizing radiation, such as X rays, which can break chemical bonds). Scientists measure the strength of EMF using two separate units: electric fields are measured in volts per metre (V/m), and magnetic fields in microtesla (μT). For a line operating at the highest voltage in the UK (400 kilovolts), electric fields typically attain a maximum of 11,000 V/m, and magnetic fields 40 μT . These figures are not dissimilar to the levels of EMF to which people are normally exposed; for example, household electrical appliances can create fields of several hundred V/m and tens of μT . Moreover, because EMF diminishes rapidly with distance from the source, EMF from overhead lines declines to less than 10% of its highest value within 25-50 metres from the line. If the shielding effect of housing is taken into account, the levels of EMF for people living close to high voltage lines are not appreciably higher than those produced by other common sources.

Over the last thirty years, there has been considerable scientific attention on studying the possible effects of EMF exposure upon human health. Early studies into the possible hazards of occupational EMF exposure were followed by the suggestion that residential EMF exposure could increase the risk of cancer (Wertheimer & Leeper 1979). This hypothesis, along with widespread public concern, led to worldwide research: epidemiological studies into the degree of association between EMF exposure and ill health, and laboratory experiments of possible effects have been carried out extensively (De Merritt 1990). The results of this research have not been entirely conclusive, but have moved towards a consensus amongst scientists and policy makers. Although Scandinavian studies in the 1980s suggested that EMF exposure might be associated with childhood leukaemia, the majority of studies have not provided

strong evidence linking EMF exposure with incidences of cancer. Moreover, national and international committees that have reviewed the results of many hundreds of studies have generally concluded that the evidence for health risk is too weak to be persuasive (WHO 2000). For instance, an advisory group to the UK's National Radiological Protection Board (NRPB) completed a major review of experimental and epidemiological studies, with the conclusion that there is insufficient evidence that EMF causes cancer (NRPB 2001). However, their report did acknowledge that *the possibility remains* of an increased risk of leukaemia for children who are subject to intense and prolonged exposure to magnetic fields.

This body of scientific research has developed primarily as a response to the possible risk to people living or working close to overhead lines (more recent attention has also been given to mobile phone base stations as a source of EMF (IEGMP 2000, Burgess 2004)). The popular reporting of the results of this research has generated further public concern, which has regularly reached a level of anxiety. For example, in the UK, a 1996 television documentary entitled *Electricity and Cancer* raised localised fears amongst people living near overhead lines. Inevitably, claims and counter-claims of health risk have been put forward, fuelling further public debate. This is illustrated by media reporting of the NRPB's review referred to above and the results of separate research challenging the NRPB's conclusions.

BATTLE LINES DRAWN IN PYLON DEBATE

Whether it was sheer coincidence or not, the publication of two, entirely contradictory, studies relating to power line safety in the same week will leave consumers rightly feeling confused and concerned. On Thursday, Professor Denis Henshaw, of the University of Bristol, released the results of a large-scale investigation involving tests taken under and around thousands of pylons. On Friday, the world's largest statistical analysis of childhood cancer hit the pages of

The Lancet... it seems unlikely that either will prove the definitive answer (BBC News Online, 3rd December 1999).

The conclusions of this separate research have, in turn, been vigorously disputed by the NRPB, and do not typify the emerging, albeit qualified, consensus on the likely safety of exposure to EMF from overhead lines. However, this illustrates the readiness of the media to publicise continuing scientific uncertainty and public sensitivity on the issue.

NEW CANCER LINK TO POWER LINES

New evidence that high voltage power lines cause cancer by making particles of pollution stick to people's lungs has been uncovered by a team from Bristol University. The team's research shows that car exhaust particles get an electrical charge from overhead power lines that makes them "sticky" - giving people living close to the lines two or three times the average daily dose of potentially damaging pollutants in their lungs (The Guardian, 21st September 2000).

This research hypothesizes possible causation of ill health, thus raising new uncertainties that call for a reappraisal of the degree of risk involved (Harremoës et al 2002). Nonetheless, official bodies have generally accepted the prevailing view of the scientific community that firm evidence pointing to a risk of cancer from EMF exposure is lacking. (There is acknowledgement that exposure to high levels of EMF has other health effects, such as vertigo and nausea. Exposure limits designed to prevent these effects have been commonly accepted. For example, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) has published guideline limits for EMF exposure, based solely "on short-term, immediate health effects" (ICNIRP 1998, p496).)

In the UK, the National Radiological Protection Board acts as the statutory adviser to the government on radiological protection matters. They have set exposure limits based on the well-established effects of EMF (NRPB 1993), and, as indicated above, have repeatedly concluded that research on other possible health effects do not justify restricting human exposure to EMF (NRPB 1999). This advice has provided the UK government with an effective policy position. This can be seen in a draft circular produced by government departments in 1998, that aimed to give guidance to planning authorities on EMF. This adopted the NRPB's position, stating that planning authorities "should have regard to... the lack of convincing evidence of a causal link between exposure to EMFs and cancer" (DETR and DoH 1998, para. 17). Similarly, the government department responsible for granting consent for overhead power lines has relied upon the NRPB's advice, and has not taken alleged health effects into account when considering applications (Cowell 2002). However, a recent shift is detectable in the NRPB's position, in that, whilst maintaining that restrictions on exposure are not justified on the basis of cancer studies, "the exposure of children to power frequency magnetic fields is an issue requiring consideration for application of the Precautionary Principle" (NRPB 2003, para. 29).

EMF and Local Planning Authorities

Planning Responses to EMF Concerns

Given the physical dominance of overhead lines, and the constraints they impose on surrounding development, it is unsurprising that they should be a matter for local planning; their presence is commonly taken into account when assessing proposals for nearby development. The planning of surrounding land uses (and of the overhead lines themselves)

has traditionally been couched in terms of 'amenity', with emphasis on the visual effects of overhead lines (Goulty 1990), the aim being to minimize any disamenity for residents and other members of the public. However, planning authorities have increasingly come to regard the possible effects of EMF as a valid factor in the land-use equation. This is illustrated by recent research into policies on the topic advanced by planning authorities throughout England and Wales as part of the preparation of statutory development plans. In the UK, planning authorities have a statutory duty to prepare plans that indicate the proposed use of land in their areas; these plans consist largely of policies that guide the consideration of applications for development. (The structure of these plans is currently undergoing major reform, but the principle of policy-led development remains unchanged.)

This research was undertaken as part of a broader investigation into local policy relating to high voltage electricity installations (Jay and Wood 2002, Jay 2004), during which it became evident that the issue of EMF is a pressing concern for a number of planning authorities, and defines a distinctive subset of this larger body of policy. Of the 418 development plans that were being prepared throughout England and Wales in 2001, 50 included, at least in a draft version of the plan, a policy statement (understood to include both formal policies and accompanying text) specifically demonstrating concern for the possible effects of EMF. Furthermore, 59 (overlapping to a large extent with the 50) included a policy statement concerned with the proximity of other forms of development to overhead lines. Other authorities have also given consideration to EMF issues, but decided against pursuing formal policy (see below). Figure 1 shows the geographical distribution of the district and unitary authorities that made direct reference in their plans to the possible effects of EMF. This indicates that there is a wide dispersal of authorities raising this topic throughout England and Wales; it also shows some clusters of authorities advancing similar concerns. This suggests

that policy is partly a response to widespread features, such as the distribution of overhead lines themselves, but also more locally prevalent features, such as organized opposition to overhead lines, and possibly the interaction of neighbouring authorities; these and other aspects of policy formation are explored further below.

INSERT FIGURE 1 NEAR HERE

The content of these policy statements, and the motives and influences at work upon them, were studied in more detail through the case study of a number of relevant authorities. This showed that several measures are being proposed to protect residential areas, especially, from the perceived effects of EMF. These generally seek to maintain a certain distance between urban development and overhead lines, and include:

- resisting the construction of new overhead lines near residential areas;
- setting development constraint corridors along the length of existing lines;
- adjusting the design and layout of new development around overhead lines;
- placing lines underground.

Of these, the second is most common. In an approach similar to of maintaining safe distances from hazardous sites (Walker 2001), corridors of a fixed width measured from the centre of overhead lines are proposed, within which specified types of development would not be permitted, especially housing, schools, workplaces and formal recreation facilities. These corridors are variously referred to as exclusion corridors, buffer zones, stand-off zones, cordon sanitaires, etc., typically described as 20-50m wide, thus enclosing an area beyond which EMF

levels would be expected to decline sharply. For example, Swindon Borough Council, in southern England, states in its plan:

No dwelling will be permitted directly beneath 132kv overhead cables; or within an 'exclusion zone' which is a minimum of 20 metres from the centre line of the pylon towers; or within 5 metres of the base of an electricity pylon (Swindon Borough Council 1999, p142).

It is, therefore, within the context of potential development near to existing overhead lines that EMF-related health concerns are being given policy expression. There are few, if any, measures being proposed to protect housing, etc. *already* built close to overhead lines, such as re-routeing overhead lines away from existing residential areas. In one sense, this is an acknowledgement of the limitations of planning powers, but also has the effect of displacing the issue: the inability to meet what are seen as the legitimate concerns of people currently affected by overhead lines shifts action into trying to protect future residents. The emphasis is on improving standards for future development. This is illustrated in the Swindon case, where housing was first built in close proximity to a high voltage line in the early 1980s. Little allowance was made for the presence of the line, with some dwellings built directly underneath the conductors. More recent housing, built further along the route of the same overhead line, has been spaced more widely from it, in accordance with the exclusion zone policy (Figure 2).

INSERT FIGURE 2 NEAR HERE

Similar approaches can be found through the use of other planning instruments, such as local, non-statutory planning guidance, and site-specific planning briefs. For example, Ogwr Borough Council (now Bridgend County Borough Council) in south Wales prepared a development brief for a major housing development on the outskirts of the town of Bridgend. The site is bisected by a high voltage line; the brief stipulated that no housing should be built within 20m of it (Ogwr Borough Council 1996). These and other examples suggest that the strategies adopted by authorities for responding to EMF concerns are shaped by the experience of planning controls in their areas; the practice of dealing with development in the vicinity of overhead lines provides precedents and ideas that then become incorporated into more widely applicable policy.

Community Unease and Political Representation

Not surprisingly, authorities that are seeking to address EMF-related health concerns are directly affected by high voltage lines in their areas. There are, in fact, two spatial patterns evident in this regard. Firstly, many authorities contain within their boundaries a high density of electricity installations originally constructed to feed directly into urban and industrial areas; here, the proximity of housing to lines is usually a long established feature. Secondly, a growing number of authorities are experiencing suburban growth that is now encroaching on lines originally routed to avoid the urban areas; this is a more dynamic pattern than the first, and is leading to a new juxtaposition of housing and high voltage installations. In both types of setting, however, public sensitivities to the possible dangers of living, working and playing within immediate range of overhead lines have recently become more acute.

The manner in which local feelings have been generated and have fed through to planning authorities has been marked by a number of recurring features. Firstly, media reports on the alleged risks of EMF exposure, as illustrated above, have played a part in raising fears amongst local communities that find themselves overlooked by overhead lines. Secondly, communities have organized their unease about EMF exposure through individual and group political action, targeting their locally elected representatives. Thirdly, local politicians have articulated these feelings in the local government arena, and have taken on a lobbying role of their own to press for measures to minimise the possible risks of EMF exposure. Fourthly, personal experience of the supposed effects of EMF has sometimes bolstered the stances adopted by activists.

This pattern of agenda-setting was evident in Beckton, in London, in the early 1990s. Here, housing had recently been built with little regard for a high voltage line running through the neighbourhood; one pylon was placed immediately adjacent to a number of the new properties (Figure 3). Local anxiety about the presence of the line arose, following national media allegations of the health risks of EMF exposure. These concerns were strongly voiced by community groups and in public meetings, and received the support of locally elected councillors. This coincided with early stages of the planning authority's preparation of its development plan, and one councillor made efforts to ensure that the possible health risks of overhead lines were addressed in the plan (Newham Council planning officers 2001). More recent examples of this process can also be found. In Rotherham, Yorkshire, anxieties were raised amongst the public about the proximity of a children's play area to a line, following media attention; this was taken up by councillors, who pressed for a planning response (Rotherham Metropolitan Borough Council planning officer 2000). An example of personal, anecdotal experience motivating action is that of a concerned councillor recalling the death

from cancer of an acquaintance who had lived in close proximity to a pylon (Bridgend County Borough Council elected member 2001).

INSERT FIGURE 3 NEAR HERE

The perceived risk to health from EMF exposure is therefore a sensitive, media-led issue, capable of provoking individuals and communities to organised protest (Hansen 1993). Moreover, EMF fears have become politicised, in that politicians (of different parties) have taken on a strong advocacy role for their constituents. The importance attached by councillors to representing community feeling is evident in the degree to which they have sometimes pursued the matter against the advice of planning officers who have become aware of the difficulties involved in pursuing this topic. This intensity of conviction is perhaps reflected by the clusters of authorities that have raised EMF concerns in their plans, as shown in Figure 1; this suggests that feelings have run high and spread in certain areas, provoking cross-border reactions.

Policy Contestation

A further step in the study of development plans throughout England and Wales was to assess the extent to which the strategies adopted by planning authorities to respond to EMF concerns are then challenged by other interests, especially the electricity industry. Formal representations brought against proposed plan policies by National Grid, a major player in the industry, were taken as an indicator of this (National Grid is responsible for the high-voltage electricity transmission network in England and Wales). This showed that a relatively high

proportion of authorities attempting to advance policy relating to EMF faced objections from National Grid (Jay and Wood 2002). The authorities that faced these objections, some of which went to considerable lengths to defend their positions, are shown in Figure 1. This suggests a number of 'hotspots' where policy contestation has been particularly fierce.

The industry's response to local policy on EMF has been to refute resolutely the assertion that there is a possible health risk, basing its position on the conclusions of the NRPB, as exemplified by this statement at a plan inquiry:

The advice of the NRPB gives no reason on grounds of a health hazard as to why high-voltage power lines should be sited away from residential or other developments or why developments should be kept away from existing installations (National Grid 1999, p9).

Crucially, the industry has opposed the principle of fixed-width corridors along the length of overhead lines (beyond regulatory safety clearances) within which certain types of development should not be permitted, insisting that there are no health-based grounds for this approach; this is despite the advantage to line maintenance that such corridors could present to electricity utilities.

In their defence, planning authorities have emphasized the continuing uncertainty about the possible risks associated with EMF exposure, frequently calling on the need to take a precautionary approach when planning development near overhead lines; direct reference has often been made to the precautionary principle in this regard. This has often been coupled with an allusion to high levels of public concern about the matter, implying that the public

perception of risk strengthens the case for precautionary measures. So Bridgend County Borough Council states, in a draft version of its plan:

While the Council has noted ... that there is no convincing evidence to date of a causal link between exposure to electromagnetic fields and ill health, it recognises however, that there are genuinely held public perceptions to the contrary... It will therefore continue to assess such proposals with due reference to the Precautionary Principle (Bridgend County Borough Council 2001, p96).

The electricity industry has pursued its opposition to any acknowledgement of risk that oversteps the NRPB's stated position to objections to draft policy of this kind, often making its case at plan inquiries. Here, inquiry inspectors have generally accepted the arguments put forward by the industry, and have recommended that planning authorities should modify their positions. In fact, a string of inspectors' reports assert the lack of scientific evidence for EMF concerns, the need for planning authorities to follow the NRPB's advice, the inappropriateness of appealing to the precautionary principle, and the danger of unnecessary public concern being aroused and areas being blighted by the adoption of exclusion zones (eg. Calderdale Metropolitan Borough Council 1994, Lincoln City Council 1997, Swansea City and County 1998). Inspectors have typically recommended that references to EMF and associated health risks should be deleted from plans, and more flexible approaches than exclusion zones should be adopted.

This aspect of development plan policy has proved to be an area of conflict out of all proportion to the relatively minor place that the topic has within plans. Large resources have been deployed against the efforts of planning authorities to establish what they see as

reasonable protective measures. Planning officers, in their turn, have vigorously defended their draft policies, drawing on international precedents and supportive principles (often accessed via the internet), and also sharing information across authority borders. But the resources available to them have been inadequate to compete with major utilities, and ultimately, the electricity industry's appeal to technical evidence and claims of government backing have been more persuasive to inspectors. Nonetheless, some planning authorities have reacted to defeat with surprise, as expressed by one planning officer's reflections:

It seemed a bit strange to us that they didn't see in this circumstance a precautionary principle to apply; we felt that the jury is still out to an extent, and that until there was no doubt at all we should operate a precautionary principle (Rotherham Metropolitan Borough Council planning officer 2001).

These difficulties have led to some authorities being 'warned off' the issue. For instance, Sheffield City Council, in Yorkshire, decided against attempting to incorporate public anxieties about EMF exposure into their plan, despite local concerns about housing near an overhead line, because of neighbouring Rotherham's policy difficulties:

A policy was seriously considered, but not pursued on learning the electricity industry would oppose it... We didn't have the resources for an expert witness (Sheffield City Council planning officer 2001).

As well as giving voice to community feeling, planning authorities have therefore come to anticipate the strength of likely objections and act accordingly. To what extent the recent reference by the NRPB to the possible applicability of the precautionary principle, as noted above, swings the argument in their favour, remains to be seen.

Policy Adaptation

The experience of confrontation over these attempts to pursue EMF concerns has, in some cases, led to planning authorities shifting the focus of policy away from hotly disputed areas into more benign territory, whilst maintaining their basic objectives. A number of strategies are discernible in this regard, which illustrate the tenaciousness of local authority concerns in the face of industry opposition. The first is to drop references to the precautionary principle, and make recourse to the less stringent notion of 'prudent avoidance' - by the London Borough of Merton Council (2001), for example. This advocates protective measures being taken when there is reasonable suspicion of harm, but not necessarily the degree of scientific evidence that would be expected for the precautionary principle to apply. Commensurate with this lower 'burden of proof', it is only expected that relatively simple and low cost measures should be taken to reduce risk (WHO 2000). It was originally formulated as a principle in the 1980s in response to EMF fears, and has specifically been adopted in relation to the siting of overhead lines in some parts of the world (UK CEED 1991). However, attempts to invoke prudent avoidance have also been resisted by the electricity industry, and are weakened by the lack of any wider policy backing for it within the UK.

A second means of stepping away from conflict has been to drop any mention of EMF in policy statements, but to find alternative grounds for the same remedial measures. So Aylesbury Vale District Council (1998), in southeast England, proposed 50m wide zones along the length of overhead lines, within which residential-type development would not be permitted, purely on the grounds of 'amenity', such as the visual intrusion and noise effects of overhead lines. Although EMF concerns certainly did provide impetus for the policy, the council persisted in its argument that it was acting in the interests of amenity alone - a term that is indisputable in

planning circles, even if it is not clearly defined, and is open in this context to inferences of well being and health.

Thirdly, some attempt has been made to deal with EMF indirectly, under more generic titles. Mendip District Council, in southwest England, shifted their EMF concerns into the more established context of hazardous installations, hiding them in a general statement that “Development should not be located near to premises or structures where... a risk to health or safety arises” (Mendip District Council 1998, p22). This did not attract any challenge from the electricity industry, which would not concede that overhead lines fall into this category, and the council was aware that attempting to use this policy in the context of EMF would be problematic without a consensus that EMF exposure does indeed constitute a health threat. The best that could be hoped for was that the policy *may become* applicable to EMF at a later stage: “if it can be demonstrated that there is a health risk caused by power lines, we can use that policy” (Mendip District Council planning officer 2001). In fact, a number of planning authorities have approached the question of EMF exposure from a broader tradition of health and safety, sometimes arising out of a history of heavy industry in their areas. For instance, elected members in Redcar & Cleveland Borough Council, northeast England, were motivated by “a very real concern about health risks... and actually long before they ever got involved in electricity pylons, they had a very good track record on things like asbestos” (Redcar & Cleveland Borough Council planning officer 2001).

Planning authorities have therefore proved resilient in attempting to respond to the growing anxieties of communities with high voltage installations in their localities. In seeking to address the issue, planning officers have drawn on the resources to hand: local experience of development around overhead lines, related planning issues, environmental protection

concepts that have seemed relevant, and their own informal networks. Notably absent, however, has been explicit planning guidance on the matter, either regionally or nationally. The draft circular on planning and EMF (DETR and DoH 1998) proved abortive, perhaps because the findings of research projects were still awaited. This left the NRPB as the only source of official advice. But its advice is not clearly geared to planning matters, and the NRPB, as a non-governmental body, is not one that planning authorities naturally look to for guidance; it may even be seen as too closely aligned with the electricity industry. The sense of void felt here was put curtly by one officer: “National guidance would have saved a lot of trouble” (Rotherham Metropolitan Borough Council planning officer 2001). Indeed, some inspectors have called for uncertainties to be resolved at a national level (eg. Lincoln City Council 1997). It has, instead, been left to individual authorities to exercise their ingenuity in pressing their case for protective measures within the constraints of the planning system, testing the boundaries of what is acceptable, and, where possible, slipping unseen through the boundaries.

The Latticework of Risk

For local planning authorities to apply measures to protect citizens from perceived threats, or ‘things like asbestos’, is not new, arising partly out of long-standing health and safety concerns. For instance, UK planning guidance encourages measures to ensure adequate distance between hazardous substances and sensitive land uses (DETR 1999), in a way now being echoed in relation to EMF. So it may not seem surprising that planning authorities, faced with democratically expressed public anxieties about the possible risk posed by high voltage installations, are turning to this issue. But the attention recently given to this topic is more fundamentally symptomatic of the growing pervasiveness of threats arising from industrial society, interpreted by Beck (1992) as the ushering in a ‘risk society’ characterized by unseen

and ubiquitous dangers. Even if the pylons have been 'in the back yard' for a considerable time and have become a familiar part of the urban landscape, action now seems imperative because they are perceived as the possible source of a serious threat - all the more worrying perhaps, because of the invisible 'leakage taking place over the years. The fact that many authorities are acting in the ways described above is evidence of a heightened sense of risk being attached to EMF exposure. These planning initiatives can themselves be interpreted as the rippling out of social concern, originating in a range of cultural perceptions and communication processes (Kasperson et al 2003). Planning authorities may then, of course, be seen as (or accused of) creating a further amplification of risk, reflecting a sense of danger back to local communities – as suggested by inspectors fearful of 'unnecessary public concern' being aroused by the adoption of exclusion zones. But underlying these processes, this expression of concern illustrates the sense of threat increasingly associated with industrial edifices and processes.

This is, in one sense, an instance of symbolic meaning being attached to industrial infrastructure. Electricity infrastructure, for example, have been invested with symbolic associations ever since the initial development of high voltage networks. Luckin (1990) showed that the inter-war development of the electricity network in the UK was marked by conflicting cultural interpretations by different social groups, being seen as a harbinger of progress on the one hand, and a threat to the beauty of the countryside on the other. Some of these perceptions were closely associated with the physical characteristics of overhead lines themselves, through language such as 'the march of the pylons', or describing pylons as 'monsters'. Furby et al's study (1988) of more recent perceptions in the USA also found potent meanings being attributed to overhead lines, linked to prevailing social and economic trends; so farmers interpreted the siting of pylons on their land as an invasion of their territory at a

time when they were feeling the squeeze of large corporate farms around them. So it could be hypothesized that current fears about EMF exposure are a sign of deeper anxiety about the dangers faced in contemporary society, that have become focused partly on the presence of overhead lines in the midst of local communities. There is here a resonance between the unseen nature of these dangers (the invisibility of risks being a tenet of Beck's work), and the imperceptibility of EMF; an invisibility embodied, nonetheless, in the only too visible pylons 'in the back yard'; they invite hostility precisely because of their industrial and massive form, alien to the residential areas in which they are frequently found. In other words, it may be that overhead lines have become mediators of wider threats posed by advancing technologies and scales of development: global trends permeating into local settings (Giddens 1990).

However, as planning authorities have taken up these concerns, and carried anxieties about EMF exposure into the policy arena, they have inadvertently placed themselves on the frontline of conflict over what constitutes a legitimate risk. They have provided opponents with an opportunity, via the procedures of plan-making, to defend their territory, and have drawn the battle of setting the boundaries of EMF-related risk into the domain of land-use planning. Central to the electricity industry's position has been the NRPB's advice that, in relation to possible carcinogenic effects, scientific research does not justify the setting of quantitative restrictions on EMF exposure levels of the kind represented by exclusion zones. The implication here is that the evidence for any danger to public health from EMF exposure is so weak that EMF is *not* a 'thing like asbestos', and that, unlike hazards for which planning constraints are well established, 'risk' is not a relevant concept when considering the inter-relationship of overhead lines and nearby development. Nor is there sufficient uncertainty about the matter, in the eyes of the industry, to justify the adoption of precautionary measures. The industry, backed by officialdom, is adopting an 'expert-scientific' assessment of

risk, set against lay understandings of risk which are often considered to be subjective and irrational (Merritt & Jones 2000).

Planning authorities, for their part, continue to assert that significant doubts remain about the safety of exposure to EMF. Initially, this can be understood as willingness on the part of planning authorities to represent public concern, and to align themselves with local communities in the interpretation of the threats to which people are exposed. Moreover, there is some official backing for this, with the acceptance that the public perception of danger can be a planning consideration in its own right, a principle which the planning profession has sought to apply to EMF concerns (LGA 1999). More fundamentally, this is a validation of lay perspectives, which, as Beck implies, are being advanced as a legitimate challenge to expert statements, and recognizes the growing autonomy of individuals and communities to make their own assessments of risk (Wynne 1996).

But planning authority positions on this issue are not simply a reflection of public concern; they also represent an independent, measured rejection of the thresholds of acceptability of risk as dictated by scientists. This is partly based upon their alertness to disagreement amongst scientists themselves, but is also an underlying questioning of scientifically-based conclusions. Nowhere is this clearer than in the repeated calls for the application of precautionary approaches. The degree of uncertainty required for triggering precautionary measures inevitably remains ill-defined and contested; planning authorities are therefore relying upon their own judgment when it comes to applying these measures to land-use matters, and feel that it is within their competence to do so. They are bringing their own professional skills to bear on questions of risk; this extends beyond the dichotomous lay-expert forms of knowledge that initially appear to dominate. This suggests a degree of brokering on

the part of planning authorities as they look for proportionate means of responding to public concern within the constraints of existing patterns of development. This might be referred to as an 'applied-engaged' approach to questions of risk, as institutions attempt to deal with particular problems within their fields of responsibility and to negotiate the varying perspectives being brought to bear.

In this context, there is scope for more reflexive processes of debate and policy-making, of the kind emerging within spatial planning (Healey 1997), which allow for differing perspectives, including the sources of public anxieties, to be expressed and better understood, and in which trust is gradually created between parties. Interestingly, some collaborative efforts are being made in this sense in relation to the siting of overhead lines in their surroundings; urban design measures are being explored to diminish the varied impacts of lines (National Grid 2004), which, although presented in amenity terms, provide a tacit opportunity to address questions of EMF exposure. A particular role for planning may be precisely to engage with issues of deep uncertainty of this kind, "drawing on all forms of knowledge, expert and non-expert, as well as the sharing of the risks with a wide range of stakeholders" (Davoudi 2000, p131).

It is also within the field of planning that the intensely spatial expression of hazards comes to light. Within Beck's analysis, the emphasis is upon the ubiquitous nature of risk; risks have escaped their places of origin, and in contrast to historical situations, "neither spatial nor social limitations apply to contemporary hazards" (Goldblatt 1999, p374). However, from a planning perspective, risks manifest themselves in a highly localized fashion; in the case of EMF exposure, a distance of tens of metres from overhead lines is thought adequate to bring reassurance to residents. Beck does reckon that risk is still being experienced differentially; we

have a risk-distributing, as well as a wealth-distributing, society. Moreover, these two are connected; “poverty attracts an unfortunate abundance of risk” (Beck 1992, p35), and poverty can, of course, be linked in turn to spatial aspects of risk, when, for example, cheaper housing is available near industrial sites. But this is seen as a largely incidental link; in the complex array of pathways through which radiation, toxins, etc. are distributed, the importance of physical patterns is underplayed, with the emphasis being placed more upon social inequalities that transcend questions of space.

However, the experience of risk within planning suggests that location can be an overriding factor in determining upon whom risk falls, and that otherwise equal neighbours may be radically divided in this respect. Moreover, the physical presence of sources of risk generates new uncertainties and anxieties in localities, creating a dynamic interaction of the spatial expression and perception of risk (Pidgeon et al 2003). Prominent symbols of risk within physical settings are likely to magnify underlying concerns, and also to become imbued with a further sense of hazard. At the same time, the increasingly widespread nature of such objects ensures that their associated sense of risk becomes familiar to many. The spatial occurrence of the objects of risk is therefore an important element in both the universalising and the uneven spread of risk.

Conclusions

Residential exposure to EMF emitted from overhead lines is not a new matter of public concern, but the planning dimension of this issue has received renewed and close attention over the last few years from a significant number of local planning authorities in England and Wales. In addressing this issue, particularly through the process of forming development plan

policy, planning authorities have closely identified themselves with the perceived interests of local communities, and have been prepared to voice and defend people's understanding of the degree of risk to which they feel they are being subjected. The willingness of many planning authorities to engage with the topic explored in this article has drawn them into conflict with scientifically-based and officially sanctioned perspectives on the issue, which has left them struggling to assert their concerns with varying degrees of inventiveness.

The entry of planning authorities into this arena is to some extent a legitimization of public concerns, and a reflection of growing sensitivity to the increasing dominance of risk: the pervasiveness of increasingly uncertain threats that inevitably issue from advanced industrial society. Moreover, planning authorities are not acting simply as conduits of public concern, but represent an institutional approach to questions of risk, in which they both engage with conflicting perspectives and seek to apply solutions to specific problems. Planning authorities are inevitably concerned with the use of space, and in this, they bring important insights to questions about the manifestation and distribution of risk. Firstly, the symbolic importance of industrial infrastructure in the landscape is highlighted; edifices that have both functional and representative presence impose a sense of tangible and immediate risk in their localities. Secondly, the wider spatial patterns of risk are revealed. On the one hand, the prevalence and dispersal of the sources of risk ensure that they are experienced to a greater or lesser extent by all; on the other hand, the intensely localized nature of structures and their associated processes create a varied and uneven landscape of risk. The distribution of risk owes much to the historical and geographical use of land, and to the ensuing struggles for the allocation of land.

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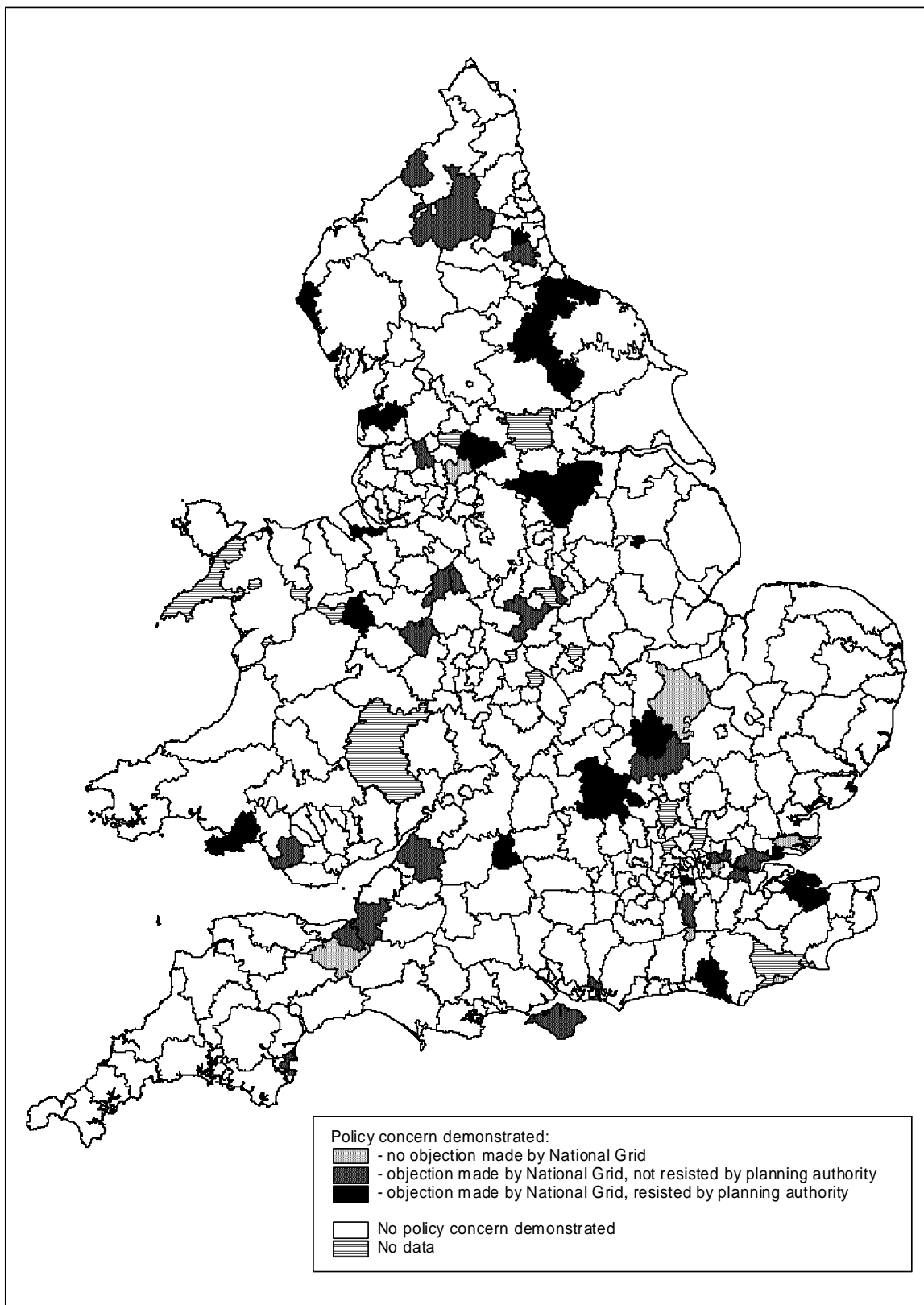


FIGURE 1: Local planning authorities in England & Wales expressing policy concern
for the possible health effects of EMF from overhead lines



FIGURE 2: Housing
'exclusion zone'
alongside a 132
Swindon



development and
kilovolt overhead line,

FIGURE 3: 1980s' housing close to a 400 kilovolt
overhead line, Beckton, London